

REMARKS

Introduction

The present Amendment is in response to the Office Action mailed June 29, 2004. The Office Action rejected claims 1-23. New claims 24-29 have been added. Claims 1-19 are therefore pending. Reconsideration of the application is respectfully requested in view of the following remarks. For the Examiner's convenience and reference, Applicant's remarks are presented in the order in which the corresponding issues were raised in the Office Action.

Please note that the following remarks are not intended to be an exhaustive enumeration of the distinctions between any cited references and the claimed invention. Rather, the distinctions identified and discussed below are presented solely by way of example to illustrate some of the differences between the claimed invention and the cited references. In addition, Applicants request that the Examiner carefully review any references discussed below to ensure that Applicants understanding and discussion of the references, if any, is consistent with the Examiner's understanding.

Claim Rejections Under 35 U.S.C. § 102

Claims 1-23 were rejected under 35 U.S.C. § 102(e)¹ as being anticipated by U.S. Patent No. 6,499,091 to Bergsten. Anticipation, as discussed in M.P.E.P. § 2131, requires that "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The following

¹ Because *Bergsten* is only citable under 35 U.S.C. § 102(e), Applicants do not admit that *Bergsten* is prior art to the claimed invention, but reserve the right to swear behind *Bergsten* if necessary to remove it as a reference.

discussion illustrates that Bergsten does not satisfy the requirements of *Verdegaal* and Applicants therefore respectfully traverse the rejections made in the Office Action.

Bergsten teaches a system and method for synchronizing data between mirrored subsystems. As discussed below, synchronizing data between mirrored subsystems is significantly different from "a method for restoring data blocks that are lost at the primary mass storage device", as in claim 1.

For example, Figure 1 of Bergsten illustrates an embodiment where a first storage device suspends operation. Bergsten teaches that the operation of the first storage device is suspended, for example, due to "operational failure, data transfer failure, and the like, thereby preventing the first storage device from receiving and storing data." *See* col. 3, lines 15-18. In other words, Bergsten teaches that the first storage device does not receive and store data. Clearly, the data on the first storage device is not lost.

Because the first storage device does not receive or store data, a map is created that includes "a map entry having an identifier that describes a range of addressable data blocks." *See* col. 3, lines 18-21. Each map entry in the map "corresponds to a data block modified after the operation of the first storage device is suspended." *See* col. 1, lines 61-63; *see also* col. 2, lines 5-9; col. 3, lines 21-23. In other words, the map only identifies data blocks that have changed after the first storage device was suspended. When the operation of the first storage device is restored, "the range of addressable data blocks described by the map and the included map entries are copied to the first storage device." *See* col. 3, lines 26-28.

Because the map of Bergsten only corresponds to data blocks modified after the operation of the first device is suspended and because the operation is suspended due to events that prevent the first storage device from receiving and storing data, the data on the first storage

device is not lost as previously stated. In other words, Bergsten teaches that the first storage device can be returned to full operation status by copying the data blocks described by the map to the first storage device. *See* col. 2, lines 26-32. Because full operation status is returned by copying the data blocks which changed after operation was suspended, it is clear that the existing data on the first storage device is not lost.

In contrast, claim 1 requires "losing the data blocks at the primary mass storage device". This is illustrated, for example, in Figure 3A where the data blocks 360 are lost. As described above, the data blocks of Bergsten are not lost. Rather, the first storage device in Bergsten is prevented from receiving and storing data blocks. In fact, the map taught by Bergsten cannot be used to restore lost data blocks on the first storage device because each entry in the map "corresponds to a data block modified after the operation of the first storage device is suspended." *See* col. 1, lines 61-63.

In Bergsten, the data blocks corresponding to entries in the map are written to the first storage device after operation of the first storage device is restored. The entries of the map therefore determine what is written to the first storage device. Claim 1, in contrast, begins restoring the lost data blocks after receiving a first read request. Because the data blocks are lost, the first read request is transmitted "to the backup computer system". As the backup computer system services the read request, the data blocks are written "to a mass storage device associated with the primary computer system".

This has the advantage, as described in the specification, of enabling the primary computer system to continue functioning even though its data is lost. Further, when a second read request is received for a data block that has been written to the mass storage device associated with the primary computer system in response to the first read request, claim 1

requires "responding to the second read request using the mass storage device associated with the primary computer system." This further illustrates that the primary computer system can continue functioning even though its data was lost.

Bergsten thus depends on the teaching that the data on the primary storage device is not lost while claim 1 requires "losing the data blocks at the primary storage device". This teaching has an impact on how the data is restored. More specifically, one of skill in the art would not use a map of entries made after operation of the storage device was suspended to restore existing data that has been lost. Bergsten simply requires using a map that identifies changed data blocks that can be written to the mass storage device when operation of the first storage device is resumed.

The above discussion illustrates that "after losing the data blocks at the primary mass storage device, receiving a first read request that would otherwise be processed by the primary computer system" and "transmitting the first read request to the backup computer system" are not taught by Bergsten. More specifically, Bergsten teaches that the map is used to restore the first storage device. Bergsten does not teach transmitting a read request to a second storage device that would ordinarily be processed by the first storage device because Bergsten is using a map to identify data blocks modified after operation of the first storage device is suspended.

In one example, the operation of the primary storage device in claim 1 is not necessarily suspended (as taught by Bergsten) because claim 1 requires "transmitting the first read request to the backup computer system" and "as the backup computer system returns one or more data blocks from the backup mass storage device in response to the request, writing the one or more data blocks to a mass storage device associated with the primary computer system".

Further the map of Bergsten does not enable the primary computer system to perform the acts of "receiving a second request, wherein the second read request is for at least one of the one or more data blocks that have been written to the mass storage device associated with the primary computer system; and responding to the second read request using the mass storage device associated with the primary computer system." The map taught by Bergsten does not track what was written to the primary mass storage device in response to the first and second read requests.

Each of the claims 9, 15, and 18, for example, also require a loss of data blocks from the primary computer system. Claim 9 requires "once the data blocks have been lost from the primary mass storage device" Claim 15 requires "directing read requests of the one or more lost data blocks" and "the primary mass storage device loses one or more data blocks" Claim 18 requires "experiencing loss of data blocks from the primary computer system"

For at least the above reasons, Bergsten does not teach or anticipate claim 1. For at least the same reasons, Bergsten does not teach or anticipate claims 9, 15, and 18. The dependent claims 2-8, 10-14, 16-17, and 19-23 depend from one of the independent claims and overcome the cited art for at least this reason.

Claim Rejections under 35 U.S.C. § 103

Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Bergsten in view of U.S. Patent No. 6,389,459 (McDowell). The above discussion illustrates that Bergsten does not teach claim 1. As McDowell is only used to illustrate a system with non-mirrored storage devices, claim 5 is believed to overcome the rejection under § 103(a) for at least the reasons discussed above.

New Claims

New claims 24-29 have been added by this amendment. Claims 24 requires "generating read requests for data blocks that have been lost in a primary mass storage device" and claim 28 requires "accessing a backup storage device if the particular data block is lost". As discussed above, this requirement is not taught or suggested by Bergsten. Further, Bergsten does not teach "directing each read request for a first data block to a backup mass storage device, wherein the data block returned from the backup mass storage device is written to the primary mass storage device; and directing each read request for a second data block to the primary mass storage device if the second data block has already been written to the primary mass storage device in response to a previous read request" as previously discussed.

In other words, Bergsten does not restore lost data blocks using the read requests as required by claims 24 and 28. Instead, Bergsten uses a map to simply copy data blocks that have changed after operation was suspended. For at least these reasons, claims 24-29 are not taught or suggested by Bergsten.

Conclusion

Claims 1-29 are pending and are believed to be in condition for allowance. In the event that the Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview, the Examiner is requested to contact the undersigned attorney.

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Amendment "A" dated October 28, 2004
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Dated this 28th day of October 2004.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Carl T. Reed", written in a cursive style.

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